

# *Vitrea contracta* (Westerlund) and Other Introduced Land Mollusks in Lynnwood, Washington

by

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*Abstract.* The introduced land mollusk species *Vitrea contracta* (Westerlund, 1871), *Cionella lubrica* (Müller, 1774), *Oxychilus alliarius* (Miller, 1822), *Arion rufus* (Linnaeus, 1758), *Arion subfuscus* (Draparnaud, 1805), *Limax maximus* Linnaeus, 1758, and *Deroceras reticulatum* (Müller, 1774) occur in Lynnwood, a suburb of Seattle, Washington. All are natives of Europe and introduced and dispersed through human agency, probably including the use of leaves from other lots as mulch.

THE ONLY previous records of the European zonitid land snail *Vitrea* (*Crystallus*) *contracta* (Westerlund, 1871) in North America are from the San Francisco Bay area, California (ROTH, 1977). There it was found in leaf litter and on stems of ivy in landscaped or otherwise disturbed areas of San Francisco, and in drift taken from around Lake Merritt, Oakland.

In August 1983, we found *Vitrea contracta* in Lynnwood, a suburb of Seattle, Washington. The occurrence is in two adjacent groves of red alders (*Alnus rubra*), each about 10 × 10 m in dimension, planted as woodlots on property between 44th Avenue W. to the east, 188th Street S.W. to the south, 46th Avenue W. on the west, and an unnamed driveway to the north (SE¼ NE¼ sec. 16, T. 27 N, R. 4 E, Willamette Base and Meridian; USGS Edmonds East Quadrangle [7.5-minute series, topographic], ed. 1953, photorev. 1981).

The ground is well drained and carpeted by a loose cover of creeping buttercup (*Ranunculus repens*). At this time of the year few other herbs were apparent. Under the buttercup was about 2-4 cm depth of leafmold, consisting mainly of leaves of the alders and bigleaf maple (*Acer macrophyllum*) from a large tree growing within a few meters of the alder groves.

According to the owners, the alders were planted in 1978. They were brought in as first- or second-year seedlings, purchased from a nursery in Bothell, Washington. The groves and adjoining grounds have been mulched since

1975 with cow manure from a dairy in Bothell and with leaves and grass clippings from parks and other properties within a 24-km radius, some areas as far away as Seattle. Before its use as a woodlot, the area now occupied by the groves was used to grow strawberries. The carrying in of leaves for mulch provides an obvious avenue of introduction for litter-dwelling mollusks.

Both living snails and empty shells of *Vitrea contracta* were moderately common. The largest specimen found is an empty shell 2.35 mm in diameter with 4.4 whorls. The smallest, a live-collected individual, is 0.66 mm in diameter with 2.0 whorls.

In the Old World, *Vitrea contracta* is widespread in the British Isles as far north as the Outer Hebrides and extends throughout France, Germany, and the Low Countries. It occurs in Iceland but is absent from much of central and northern Scandinavia (ROTH, 1977; KERNEY & CAMERON, 1979). In the U.S.S.R. it occurs in the Baltic region, the Vitebsk region, and the western regions of the Ukraine (LIKHAREV & RAMMELMEIER, 1952). FORCART (1973) reported it from Palestine. KUIPER (1964) and EVANS (1972) have published habitat notes.

Other introduced land mollusks associated with *Vitrea contracta* at this site are *Cionella lubrica* (Müller, 1774), *Oxychilus alliarius* (Miller, 1822), *Arion rufus* (Linnaeus, 1758), and *Arion subfuscus* (Draparnaud, 1805). The first two species are common at the site. *Arion rufus* and *A. subfuscus* are not common in the alder groves but are more

numerous around flower pots, wood on the ground, and stacked construction blocks nearby. *Deroceras reticulatum* (Müller, 1774) was not found in the groves but occurs within 20 m, under potted plants. *Limax maximus* Linnaeus, 1758, was not found at the site in August 1983 but was collected earlier, in July 1980. In November 1979 it was found in a greenhouse on the same property.

*Cionella lubrica* has not been reported previously from the Puget Sound valley. The only other Washington record is from Walla Walla (PILSBRY, 1948). This Holarctic species occurs naturally in North America, as shown by its presence in deposits of Yarmouthian age in the Great Plains (LEONARD, 1950). However, it is decidedly synanthropic, and its occurrences in settled areas such as the suburbs of Seattle likely involve transport by humans.

The American distribution of *Oxychilus alliarius* is very incompletely known, partly because of the difficulty some authors have had distinguishing among the several introduced species of *Oxychilus* (cf. HANNA, 1966). Records from Victoria, British Columbia (LA ROCQUE, 1953), and Newport, Oregon (HANNA, 1966), place *O. alliarius* in the Pacific Northwest, but it has not been reported previously from the Seattle area. KOZLOFF (1976) indicated that *O. alliarius* is the most common *Oxychilus* in backyards in the Pacific Northwest, but did not cite specific localities. Its native range includes northern and western Europe and Iceland (KERNEY & CAMERON, 1979). The present specimens were identified while alive by their garlic-like aroma and by comparison of the shells with the excellent diagnosis and illustrations of KERNEY & CAMERON (1979).

*Arion rufus* was identified by comparing the reproductive system with the figures and diagnoses of CAIN & WILLIAMSON (1959), QUICK (1947, 1960), and KERNEY & CAMERON (1979). Diagnostic features include the large, bulky, upper atrium and a vas deferens 1.5–2 times as long as the epiphallus. *Arion ater* (Linnaeus, 1758) and *A. rufus* are regarded by some authors as separate species (QUICK, 1947; WALDÉN, 1976) and by others as subspecies (CAIN & WILLIAMSON, 1959; QUICK, 1960; ROLLO & WELLINGTON, 1975; KERNEY & CAMERON, 1979). CAIN & WILLIAMSON (1959), although presenting evidence that the relationship is subspecific, regarded the taxonomic status as unsettled (p. 82). WALDÉN (1976) remarked that the evidence was not conclusive; we follow him in treating *A. rufus* as a species. We believe that more restrictive criteria must be met to recognize a subspecies than a species; therefore, when the evidence is inconclusive, the conservative approach is to treat the taxon in question as a species.

R. T. Paine (reported by GETZ & CHICHESTER, 1971) believed *A. ater* to be restricted to more rural areas in the Pacific Northwest, while *A. rufus* was more or less confined to cities. The criteria he used to recognize the two taxa were not specified. ROLLO & WELLINGTON (1975) summarized the history of accounts of "*Arion ater*" (including *A. rufus*) in the Pacific Northwest. They reported that dissected specimens from the vicinity of Vancouver

had genitalia more like *rufus* than *ater* as described by QUICK (1947) and noted that a figure of an Oregon specimen by PILSBRY (1948) also appeared to be *rufus*.

*Arion subfuscus* has been reported from the Pacific Northwest previously by GETZ & CHICHESTER (1971) and ROLLO & WELLINGTON (1975). In the vicinity of Vancouver, British Columbia, *A. subfuscus* occurs in both cultivated areas and natural woodland, probably becoming introduced to the woods when gardeners dumped garden refuse and compost in such areas (ROLLO & WELLINGTON, 1975). The native range of *A. subfuscus* includes most of Europe (LIKHAREV & RAMMELMEIER, 1952; KERNEY & CAMERON, 1979); it has also been introduced into northeastern North America (PILSBRY, 1948; CHICHESTER & GETZ, 1969). To our knowledge, this is the first report of the species from the Puget Sound valley. The present specimens were identified by dissection. According to WALDÉN (1976:25), "*A. subfuscus* shows a complicated subspecific taxonomy. It is not excluded that further research will show that an aggregate species is involved."

*Limax maximus* has long been known as an introduction in the Pacific Northwest (PILSBRY, 1948; HANNA, 1966; GETZ & CHICHESTER, 1971; ROLLO & WELLINGTON, 1975). HANNA (1966) summarized several reports of *Deroceras reticulatum* in western Washington from the pest-control literature. ROLLO & WELLINGTON (1975) found it the most abundant species in British Columbia. Both *L. maximus* and *D. reticulatum* are widespread in temperate Europe and introduced by commerce to North America and elsewhere.

Voucher specimens of these species are on deposit in the California Academy of Sciences. We gratefully acknowledge the support and forbearance of Mr. and Mrs. C. K. Pearce, Jr. of Lynnwood.

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